

Status in **bold**: Draft, In Review, **Official**

Doc. No.:

	E2-3P Antenna Design		Stage Gate	
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REVISION HISTORY			
Ver.	Date	Author(s)	Modifications
A1	27/8/2014	Ying Cheng	Creation
A2			

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1 INTRODUCTION

E2-1P product integrates a zigbee transceiver which is the Atmel's solution not the TI's solution. To save cost, it is better to use Printed antenna.

1.1 Simple introduction

For E2-3P, brick team already released dimension of antenna in 2013. For the following reasons, I rebuilt simulation

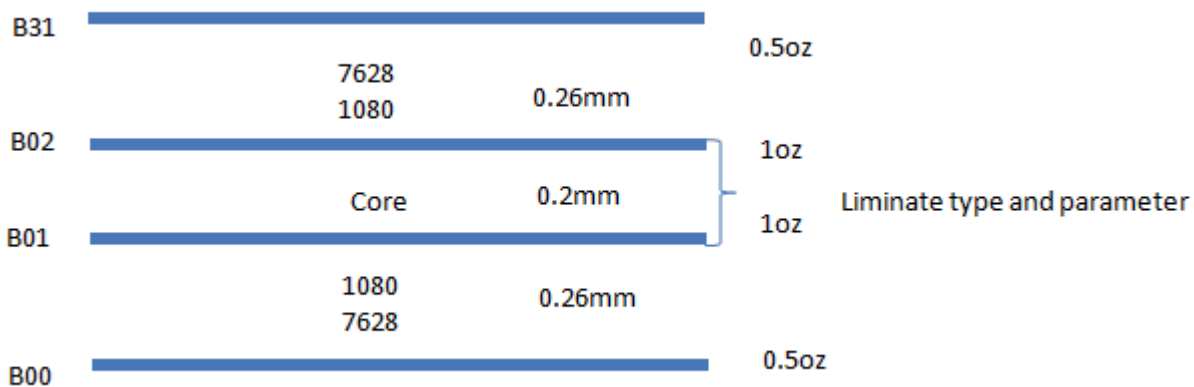
(1) Stack-up is changed to 0.26. And I added every prepregs in simulation to see impact from PP.

(2) Sensor type is different with previous simulation model based on last mechanical input from Jean-Yves Amblard

Moreover, I used similar slot compared with previous simulation.

1.2 Stack-up of PCB

The following stack-up is provided by TPC which is Chinese PCB supplier. It is based on B56 file from E square project.



Core information:

Laminate				Dk			
Thickness (in)	Thickness (mm)	Constructions	Resin content (%)	1 MHz	1 GHz	2 GHz	5 GHz
0.0080	0.203	7628x1	46.3	4.53	4.47	4.38	4.32

PP information:

Laminated Prepreg				Dk			
Glass Type	Thickness (mil)	Thickness (mm)	Resin Content (%)	1 MHz	1 GHz	2 GHz	5 GHz
7628	7.6	0.193	46.0	4.54	4.48	4.39	4.33
1080	3.2	0.081	65.0	4.05	3.99	3.87	3.79



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2 ANTENNA DESIGN

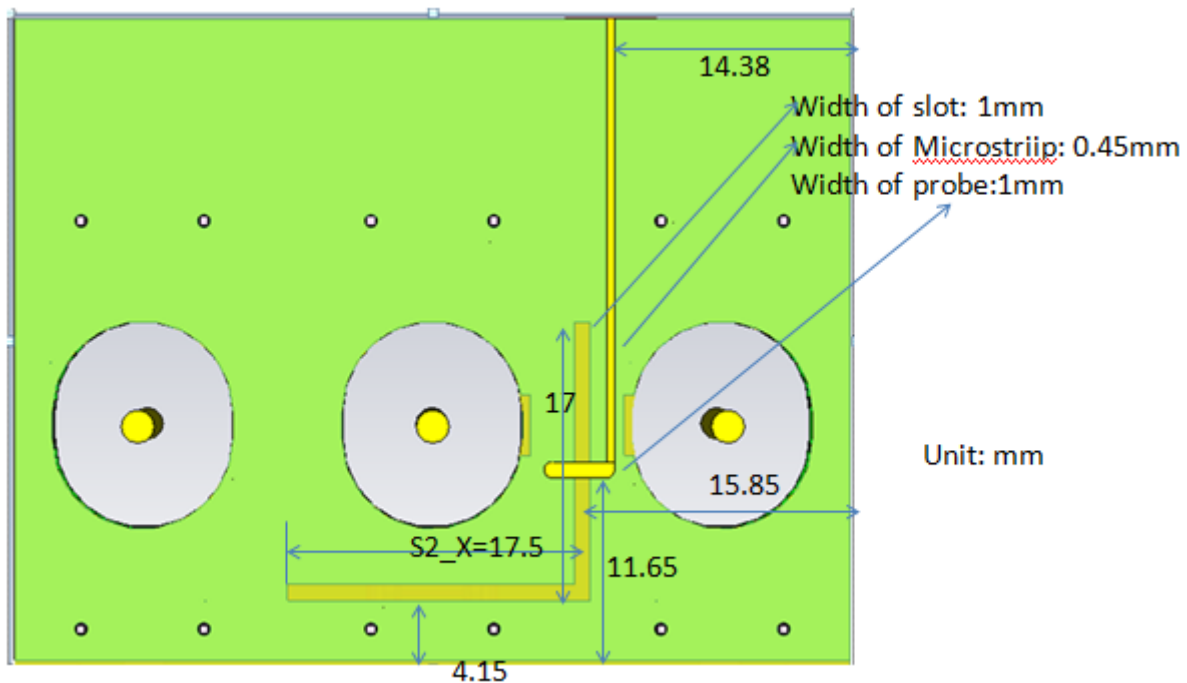
2.1 Material information

The properties of material of model will impact simulation results. In this chapter, simulations were done based the following table.

List	Properties	Approx	Electric conductivity Or Epsilon	Mue
substrate	FR4	Core:PP2x76288	4.38	1
		PP1080	3.87	
		PP7628	4.39	
trace and gnd	conductor	copper (annealed)	5.8E+07	1
shunt	Fe Ni48	FeNi48	1.23E+07	288.52
clip	Cu Sn6	CuSn6	5.66E+07	1
Pins	Cu Zn30	CuZn30	4.68E+07	1
coil wiring	Enameled Copper	Copper (annealed)	5.8E+07	1
core bobbin	LCP GF30	Plastic part	3.6	1
Current Line	N/A	copper (annealed)	5.8E+07	1

2.2 Antenna dimension

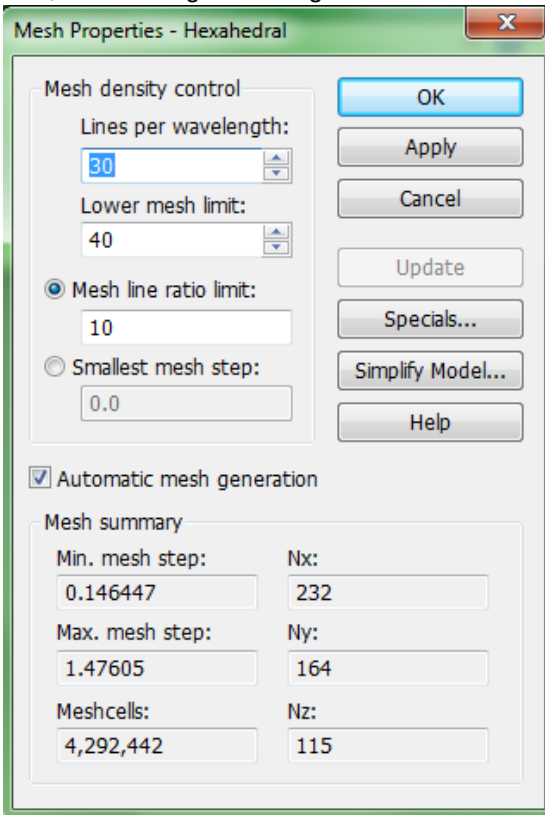
You can know the detail dimension for this antenna. Please notice the mirror relationship between the following figure and brd file.



2.3 Antenna simulation results

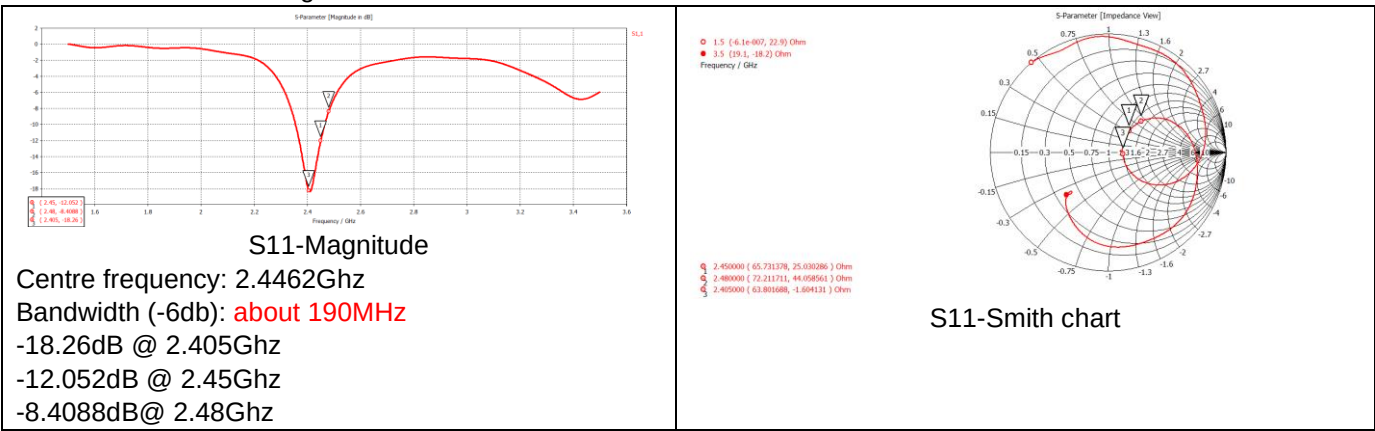
2.3.1 Meshing setting

To get accurate simulation results, we use huge meshing to do simulation.



2.3.2 S11 graphic

See the following simulation results in the table below.



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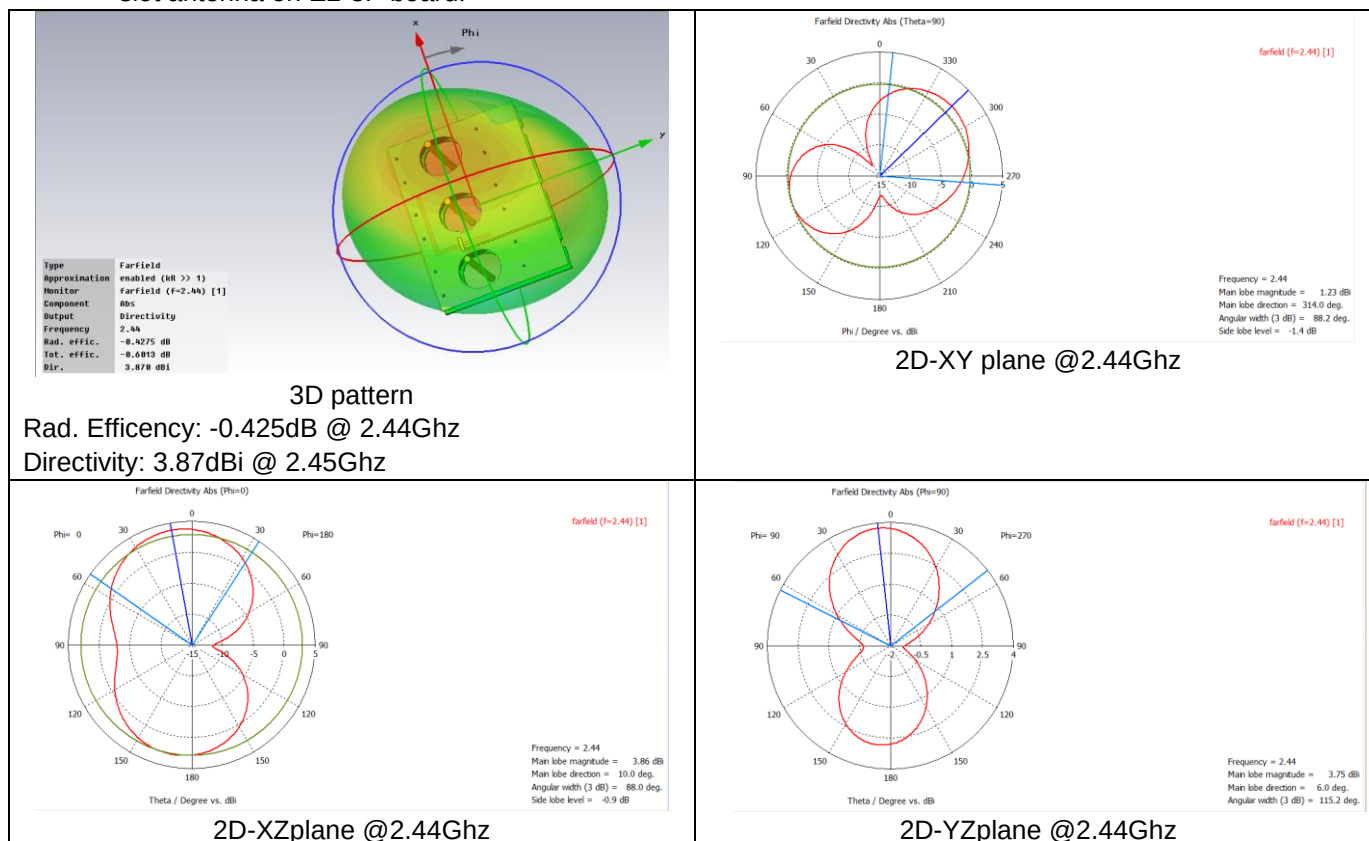
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2.3.3 Radiation Pattern

You can see simulation results from the following table. We can know the directivity is not very well of this slot antenna on E2-3P board.



2.3.4 Efficiency

You can know the relationship between frequency and efficiency from the following figure. Radiation efficiency is more than 90% within the whole frequency range.

